

Facility limits for Trinity

LA-UR-13-23896

June 4, 2013

Parameter	Minimum	Target	Maximum
Voltage to all high-powered racks		480 V AC, 3-phase	
Configuration		Prefer Delta (4-wire), phase balanced, limited harmonics	
Power connections		Direct wired with a provided means of disconnect, or a plug	
Alternative voltage for low powered racks, e.g. storage or support		208V single- or 3-phase (prefer Delta configuration). Dual voltages to the rack will not be supported.	
Aggregate peak reached power			15 MW
Peak reached power per rack			120 kW
System footprint			80 ft by 100 ft
Rack height during delivery including wheels			106 inches
Static point load on a one square inch area, without other nearby loads			1500 lbs
Dynamic load using a CISC Wheel 1 size, without other nearby loads			1250 lbs
Rack weight based on point load limitations @ 4 supports (example for 2x4 ft footprint)			3000 lbs
Rack weight based on point load limitations@ 6 or more supports (example for 2x4 ft footprint)			4000 lbs
Rack weight based on distributed load limitations			Sum of 300 lbs/sq.ft. under rack plus 200 lbs/sq.ft per 2 ft aisle in front and 2 ft aisle in back associated with the rack. Example: 2ft wide and 4 deep ft rack can weigh up to $300*2*4+200*(2*2+2*2) = 4000$ lbs
Facility air cooling aggregate load			3 MW
Facility air cooling per 2ft wide rack			15 kW @ 4ft wide cold aisles, 24 kW @ 6-8ft wide cold aisles
Facility air supply temperature	55 F	70 F	76 F
Facility air humidity	30%	40%	70%
Water cooling aggregate			12 MW
Water supply temperature	60 F / above dew point, on cool days and nights	75 F	75 F, 99.6% of the time, platform to be fully operational at this intake temperature
Temperature rise across platform	10 F	20 F	30 F (soft limit)
Water chemistry		ASHRAE with corrosion/bacterial/fungal inhibitors	
Water filtration		Full system duplex 20-mesh (1/32") strainers	Full system duplex 40-mesh (1/64") strainers
Water pipe material		black steel	
Water flow rate			8230 GPM @ 12 MW heat load
Pressure supplied to platform	30 psi	50 psi	Maximum design system pressure before failure 150 psi
Pressure drop across platform		35 psi	
Water flow rate control		Facility pumps maintain pressure drop across platform at chosen setpoint. Platform regulates flow rate but without causing excessive dynamic pressure spikes nor overall flow rate control loop instabilities.	
Optional early access development and test systems		Some details of facility requirements may differ from Trinity (e.g. air cooling only, or lower floor loading)	